

that this is not necessarily so, and that Sachs' and Eichler's emergence or ligular theory may be true as to *Araucarieæ*, and that thus the cone of these plants is really and truly a single flower. In regard to *Taxodineæ* and *Cupressineæ* he is convinced that an inner fruit scale really exists, completely adnate to the bract and soon outgrowing it, but he does not venture to pronounce on its nature, because he thus far has no ocular demonstration of it through any anamorphosis.† Professor Celakovsky concludes that the arillus of *Taxaceæ* corresponds with the ligula of *Araucarieæ*. He speaks of the *terminal* position of the ovule in this tribe as of very little morphological importance, being really a lateral ovule pushed to the top of an axis.‡

It will be of interest to those who have been misled by contrary statements, to learn that O. Heer, the celebrated phyto-paleontologist, has shown that geologically *Abietineæ* and *Taxodineæ* are the oldest conifers now known, appearing already in the Carboniferous period, while *Araucarieæ* come up much later in the Trias and Jurassic formations. But relative geological age of the different tribes of plants is of much less importance for the appreciation of their degree of development and their position in the system than some suppose. Thus the *Cycadeæ*, the Phænogams most closely allied to the vascular cryptogams, are, as Professor Heer states, very uncertain in the Carboniferous, and make their decided appearance first in the Permian rocks; therefore much later than the higher developed conifers.—G. E. in *Am. Jour. Sci.*

Limits of Michigan Plants.—The distribution of plants along the Great Lakes is a subject of much interest. The equalizing influence of the Lakes upon the climate of Michigan and adjacent states has resulted apparently in bringing together the two extremes of the floras considerably north and south of them. The mild winters allow southern species to come in, while the cool summers are favorable to the growth of more northern species.

† The writer of this is in possession of a proliferous cone of *Sequoia gigantea* which seems to prove, not only that the fruit scale in this species (and consequently in the whole tribe) is homologous with that of *Abietineæ*, in so far as it consists of leaves of an axillary shoot, yet that these leaves are not a single pair, but, as A. Braun has long ago suggested, in regard to *Cupressineæ*, that there is a number of leaves, laterally coordinate and connate, bearing a number of ovules on their back.

‡ It might be well to draw attention to the singular fact, that in the allied gymnospermous family of *Gnetaceæ*, the female flower (for such it is now assumed to be, the outer integument or utricle being considered as a two-leaved carpel) is always referred to as "terminal," whether single, double or triple, while a terminal organ can not be otherwise than single. The fact is that the female flowers are here axillary in the axils of one or more of the uppermost bracts, and, if single, are pushed to the top of the shoot.

This condition of things is seen especially along the east shore of Lake Michigan. The mild climate of this long strip of country bordering the lake renders profitable the growing of tender fruits, and has caused this "Fruit-belt" of Michigan to become widely known. The Fruit-belt is not only peculiar in its great production of peaches and berries but also to a certain extent in its botanical characteristics. Many species of plants seem to find the extreme limit of their range north or south in this belt. The following species are among those which appear to reach their limits at South Haven, Mich., fifty miles from the head of the Lake. Of course the limits as given here are only approximate, for north of South Haven there has been no complete work done on the lake shore. The interior of the state has been well studied however by C. F. Wheeler, E. F. Smith, and others, whose work is given in Wheeler & Smith's admirable catalogue of Michigan plants. For the south the GAZETTE's Indiana catalogue is often consulted.

Lycopodium complanatum, L., grows rarely at South Haven in old choppings. It evidently reaches its southern limits about the head of the Lake in Indiana. (*Ind. Cat.*)

Botrychium ternatum, Swtz., var. *dissectum*, Eaton, seems to reach its northern limits here, but var. *obliquum*, Eaton, extends farther north into the center of the state. These are not reported north of Southern Indiana in the Indiana catalogue, and do not occur in Wisconsin, according to G. D. Swezey's list.

Woodwardia angustifolia, Sm., occurs in very restricted quantity in a dense hemlock wood, along with *Goodyera repens* R. Br., *Chimaphila maculata*, Ph., *Chrysosplenium Americanum*, Schw., and the commoner *Lycopodiums*. This beautiful fern will soon disappear—as soon as the forests are removed. It is probably a survivor of the extensive swamps which once covered the state.

Phegopteris Dryopteris, Fee, occurs sparingly (*Mrs. Millington*). This is undoubtedly its southern limit in the West.

Stipa avenacea, L., and *Vilfa vaginæiflora*, Torr., seem to reach their northern limits here, although the latter occurs sparingly as far north as Lansing.

Juncus scirpoides, Lam., approaches its northern limit while *J. articulatus*, L., reaches its southern. *J. nodosus*, L., var. *megacephalus*, Torr., strays north along the shore, and occurs in the center of the state in Montcalm County (*Wheeler & Smith's Cat.*) *Clintonia borealis*, Raf., reaches its southern range at South Haven. The same is nearly true of *Cypripedium acaule*, Ait., which is rare at this point. It is reported from one locality in Northern Indiana.

Goodyera repens, R. Br., reaches about its southern limit here.

Potamogeton perfoliatus, L., var. *lanceolatus*, Robbins, occurs here, and northward to Petoskey (C. F. Wheeler).

Pinus Strobus, L., reaches its southern limit in the center of the state at Mason, near Lansing. It follows the Michigan Lake shore down into Indiana however. *P. Banksiana*, Lam., is common on light land as far south as the middle of the lower peninsula, and is then not known to occur again till we reach the head of the Lake, where it is quite abundant. It there reaches its southern limits.

Tsuga Canadensis, Carr., the hemlock spruce, reaches about its southern limits here, where it is the leading forest tree. It does not occur in Indiana.

Betula lutea, Mx. f., approaches its southern limits here. *B. papyracea*, Ait., occurs near the head of the Lake (E. J. Hill), probably its extreme southern limit.

Calamintha Clinopodium, Benth., also reaches its southern limits here. It is undoubtedly indigenous. ("Indigenous about the upper Great Lakes and elsewhere"—Gray's Man.)

Chimaphila maculata, Ph., approaches its northern limits at South Haven, although it occurs sparingly as far north as Ionia. (Wheeler & Smith's Cat.)

Vaccinium vacillans, Sol., the principal dry-land blue-berry of the upper Lake region, occurs occasionally as far south as the central part of Indiana (Ind. Cat.). At South Haven it is the leading upland berry, from this point it seems to dwindle away to the south.

Artemisia Canadensis, Mx., probably follows the shores of the Lake generally. It occurs here in great abundance, and at the head of the Lake (E. J. Hill), probably its southern range.

Solidago Virga-aurea, L., var. *humilis*, Gray, follows the Lake shore southward to this place. It is not known to occur farther south.

Cornus Canadensis, L., occurs in abundance, and strays as far south as central Indiana (Ind. Cat.), apparently far beyond its usual range.

Aralia hispida, Mx., reaches its southern limit in the West at South Haven where it is abundant. *A. quinquefolia* Decs. & Planch., also occurs, but is very rare.

Opuntia Rafinesquii, Englm., seems to prefer the sheltered interior to the Lake shores. It occurs as far north as the center of the lower peninsula (Wheeler & Smith's Cat.).

Prunus Pennsylvanica, L., approaches its southern limits here, while *P. serotina*, Ehr., takes its place, and begins to approach its northern limits, although it occurs considerably farther north toward the center of the state.

Phaseolus diversifolius, Pers., probably reaches here, its northern limits as also *Linum Virginianum*, L.

Hibiscus Moscheutos, L., occurs here, the only known locality in Western Michigan. It also occurs near the head of the Lake in Indiana (*E. J. Hill*), and at Put-in-Bay, Lake Erie (*Wheeler & Smith*). It probably follows near the lower Great Lakes generally.

Hypericum pyramidatum, Ait., occurs but is very rare. Its range seems to be north.

Other lists of Michigan Lake Shore plants were published in the GAZETTE for July and August, 1880, and from Rev. E. J. Hill in Sept. 1881.—L. H. BAILEY, Jr.

Notes from Mount LaFayette, N. H.—I have been spending the summer in Franconia, N. H. While there I collected extensively both in the valley and the mountains. Moreover, I undertook to keep a list of all plants which I recognized in passing over the roads, either on foot or when driving. I am now tabulating results and find them quite interesting, as much for the conspicuous deficiencies in certain common genera, as in the presence of unusual species.

I spent one day on Mount LaFayette, something over 5,000 feet in altitude, and collected many alpine in the short time allowed on the summit. It may interest those who live in lowlands to read the names even of these fascinating boreal species. I did not pay much attention to the plants of the lower part of the mountain, except to note their change of form as I ascended. *Solidago thyrsoides*, E. Meyer, was in its glory, and I think as handsome as the sea-side *S. sempervirens*, L. It grew several feet in height, up to an altitude of over 4,000 feet, intruding even into the peculiar dwarf forest of that region. Here I began to find *Vaccinium Vitis-Idæa*, L., in fruit (Aug. 10th). *Chiogenes hispidula*, Torr. & Gr., was very abundant, also fruiting.

After leaving the dwarf forest the path became very rough with loose, jagged stones, and there were no trees except the flat and spreading *Salix Cutleri*, Tuck. Here I began to find the peculiar alpine sedges, *Carex rigida*, Good., etc.; *Poa laxa*, Haenke, *Hierochloa borealis* Roem. & Sch., and *Aira atropurpurea*, Wahl. The most conspicuous flower by all odds was the tufted and showy *Arenaria Grœnlandica*, Fenzl., which bears here the curious local name of "mountain daisy." An unfortunate misnomer! I found large bunches of *Diapensia Lapponica*, L., in fruit, but missed my old friends *Cassiope hypnoides*, Don., and *Phyllodoce taxifolia*, Salisb., so charming on Mt. Washington. The pretty *Loiseleuria procumbens*, Desv., was in fruit. I had the good fortune to find *Geum radiatum*, Michx., var. *Peckii*, Gr., in splendid shape and very abundant, as was also the dwarf golden-rod, *Solidago Virga-aurea*, L., var. *alpina*, Bigel. I collected large quantities of this and of